

What is claimed is:

1. A moisture indicator system for a suction cleaner, comprising:

a moisture sensor mounted to the cleaner and positioned to detect the moisture level of a floor surface;

5 a circuit electrically connected to the moisture sensor for generating a control signal in response to the detected moisture level of the floor surface; and

a device responsive to the control signal for indicating the moisture level of the floor surface to a user of the cleaner.

10 2. A moisture indicator system as set forth in claim 1, wherein the moisture sensor comprises a conductance sensor responsive to the electrical conductivity of floor surface moisture.

15 3. A moisture indicator system as set forth in claim 2, wherein the conductance sensor comprises a pair of electrodes separated by a gap and an electronic circuit for generating a signal proportionate to the conductivity of moisture bridging the gap between the electrodes.

20 4. A moisture indicator system as set forth in claim 2, wherein the conductance sensor is mounted in communication with a duct of the cleaner and responds to the electrical conductivity of moisture extracted from the floor surface and passing through the duct.

5. A moisture indicator system as set forth in claim 2, wherein the conductance sensor is positioned on the cleaner to engage the floor surface and respond to the electrical conductivity of moisture in the floor surface.

5 6. A moisture indicator system as set forth in claim 1, wherein the circuit comprises an amplifier filter circuit section and at least one comparator circuit section.

10 7. A moisture indicator system as set forth in claim 6, wherein the one comparator circuit section is a schmitt trigger comparator.

15 8. A moisture indicator system as set forth in claim 1, wherein the moisture sensor is mounted proximate to a duct of the cleaner and responds to the sound pressure generated by moisture traveling through the duct.

9. A moisture indicator system as set forth in claim 8, wherein the sensor comprises a microphone and an electronic circuit for generating an audio signal responsive to the sound pressure of the moisture traveling through the duct.

20 10. A moisture indicator system as set forth in claim 9, wherein the circuit comprises an amplifier filter circuit section and at least one comparator circuit.

25 11. A moisture indicator system as set forth in claim 9, wherein the circuit comprises a conversion circuit section that converts the audio signal into a mean DC voltage.

12. A moisture indicator system as set forth in claim 11, wherein the circuit includes a comparator circuit section having a microprocessor for performing an analog to digital conversion of the mean DC voltage.

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13. A moisture indicator system as set forth in claim 1, wherein the moisture sensor comprises an optical sensor.

14. A moisture indicator system as set forth in claim 13, wherein the optical sensor is mounted proximate a duct of the cleaner and comprises an optical transmitter and receiver for optical measurement of moisture extracted from the floor surface and passing through the duct.

15. A moisture indicator system as set forth in claim 1, wherein the moisture sensor comprises a near infrared sensor responsive to the level of near infrared radiation emanating from the floor surface.

16. A moisture indicator system as set forth in claim 1, wherein the device includes a relay for disabling power to the cleaner when the moisture level exceeds a predetermined threshold level.

17. A moisture indicator system as set forth in Claim 1, wherein the device includes a semi-conductor for disabling power to the cleaner when the moisture level exceeds a predetermined threshold level.

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18. A moisture indicator system as set forth in Claim 1, wherein the device comprises at least one lamp which is illuminated by the circuit when the moisture level exceeds a predetermined threshold level.

5 19. The moisture indicator system as set forth in Claim 1, wherein the device comprises a speaker which emits an audio signal when the moisture level exceeds a predetermined threshold level.

10 20. The moisture indicator system as set forth in Claim 1, wherein the moisture sensor detects varying levels of moisture of the floor surface; wherein the circuit generates a variable control signal which corresponds to the level of moisture of the floor surface; and wherein the circuit is electrically connected to a motor-fan assembly of the cleaner for varying the power level of the motor-fan assembly in response to the control signal.

15 21. A cleaner comprising:
a duct through which moisture extracted from a floor surface travels;
a moisture sensor mounted closely adjacent to the duct for detecting the level of moisture passing through said duct;
20 a circuit electrically connected to said moisture sensor for generating a control signal in response to the moisture level detected within said duct; and
a device responsive to the control signal for discernibly indicating the level of moisture within the duct to a user of the cleaner.

22. A cleaner according to claim 21, wherein the moisture sensor comprises a conductance sensor responsive to the electrical conductivity of moisture within said duct.

5 23. A cleaner according to claim 22, wherein the conductance sensor comprises a pair of electrodes separated by a gap and an electronic circuit for generating a signal proportionate to the conductivity of moisture bridging the gap between the electrodes.

10 24. A cleaner according to claim 21, wherein the circuit comprises an amplifier filter circuit section and at least one comparator circuit section.

15 25. A cleaner according to claim 24, wherein the one comparator circuit section is a schmitt trigger comparator.

26. A cleaner according to claim 21, wherein the circuit includes a microprocessor for comparing the control signal to a threshold level.

20 27. A cleaner according to claim 21, wherein the moisture sensor comprises an audio sensor responsive to the sound pressure generated by moisture traveling through the duct.

25 28. A cleaner according to claim 27, wherein the circuit comprises an amplifier filter circuit section and at least one comparator circuit section.

29. A cleaner according to claim 28, wherein the circuit further comprises a conversion circuit section that converts the audio signal into a mean DC voltage.

5 30. A cleaner according to claim 29, wherein the comparator circuit section comprises a microprocessor for performing an analog to digital conversion of the mean DC voltage.

10 31. A cleaner according to claim 21, wherein the moisture sensor comprises an optical sensor.

15 32. A cleaner according to claim 31, wherein the optical sensor comprises an optical transmitter and a receiver for optical measurement of moisture passing through the extraction duct.

33. A wet pick-up cleaner according to claim 21, wherein the device comprises at least one lamp.

20 34. A wet pick up cleaner according to claim 21, wherein the device comprises an audible alarm.

25 35. A moisture indicator system as set forth in claim 21, wherein the device includes a relay for disabling power to the cleaner when the moisture level exceeds a predetermined threshold level.

36. A moisture indicator system as set forth in Claim 21, wherein the device includes a semi-conductor for disabling power to the cleaner when the moisture level exceeds a predetermined threshold level.

5 37. The moisture indicator system as set forth in Claim 21, wherein the moisture sensor detects varying levels of moisture of the floor surface; wherein the circuit generates a variable control signal which corresponds to the level of moisture of the floor surface; and wherein the circuit is electrically connected to a motor-fan assembly of the cleaner for varying the power level of the motor-fan assembly in
10 response to the control signal.

Sub A 38. a moisture indicator system as set forth in claim 1, including
a tank removably mounted to said suction cleaner for containing liquid;
a second sensor mounted to the cleaner to detect when the liquid of
15 said tank reaches a predetermined level;
said circuit electrically connected to the second sensor for generating a second control signal in response to the detected liquid level of said tank; and
a second device responsive to the control signal for indicating when the liquid of said tank reaches a predetermined level.

20 39. The moisture indicator system as set forth in claim 38 including a first pair of contacts connected to said second sensor;
a second pair of contacts connected to said circuit;

wherein said first pair of contacts and said second pair of contacts are in electrical contact with each other when said tank is mounted to said suction cleaner; and

5 said first pair of contacts and said second pair of contacts are not in electrical contact with each other when said tank is removed from said suction cleaner.

40. The moisture indicator system as set forth in claim 39, wherein said second pair of contacts are spring loaded contacts.

10 41. The moisture indicator system as set forth in claim 38, wherein the second sensor comprises a conductance sensor responsive to electrical conductivity of moisture within said tank.

15 *Sub A 2* 42. The moisture indicator system of claim 38, wherein the circuit includes a microprocessor for comparing the first mentioned control signal to a threshold value.

20 43. The moisture indicator system as set forth in claim 39, including a second device responsive to the control signal for indicating when the liquid of said tank reaches a predetermined level.

44. The moisture indicator system as set forth in claim 43, wherein said second device comprises at least one lamp which is illuminated by the circuit when the liquid of said tank reaches a predetermined level.

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Sub A 3

45. The moisture indicator system as set forth in claim 38, wherein said second sensor is a pressure switch responsive to a pressure level associated with said predetermined liquid level in said tank.

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46. A moisture indicator system for a suction cleaner comprising:

a floor engaging portion for moving the suction cleaner over a floor;

a handle portion pivotally mounted to the floor engaging portion;

a tank removably mounted to said suction cleaner;

a sensor mounted to the cleaner to detect when the liquid of said tank reaches a predetermine level;

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a circuit electrically connected to said sensor for generating a control signal in response to the detected liquid level of said tank;

a first pair of contacts connected to said sensor;

a second pair of contacts connected to said circuit;

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wherein said first pair of contacts and said second pair of contacts are in electrical contact with each other when said tank is mounted to said suction cleaner; and

said first pair of contacts and said second pair of contacts are not in electrical contact with each other when said tank is removed from said suction cleaner.

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47. The moisture indicator system as set forth in claim 46, wherein said second pair of contacts are spring loaded contacts.

48. The moisture indicator system as set forth in claim 46, wherein the
5 moisture sensor comprises a conductance sensor responsive to electrical conductivity of liquid within said tank.

49. The moisture indicator system as set forth in claim 46 including a device responsive to said control signal for indicating when the liquid of said tank
10 reaches said predetermined level.

50. The moisture indicator system of claim 46, wherein the device comprises at least one lamp.

51. The moisture indicator system as set forth in claim 46, wherein the
15 circuit includes a microprocessor for comparing the control signal to a threshold value.

52. A moisture indicator system as set forth in claim 1, wherein the
20 circuit includes a comparator circuit section for outputting said control signal, said device including a lamp, a switching transistor being operatively connected to said lamp and said comparator circuit, and wherein said comparator circuit transmits said control signal to turn on said switching transistor which causes said lamp to
25 illuminate.

53. A moisture indicator system as set forth in claim 46, wherein said circuit comprises an oscillator circuit.

5 54. The moisture indicator system as set forth in claim 3, wherein said electrodes are mounted in communication with a duct of a cleaner, each of said electrodes defining a rivet, each of said rivets extending into said duct.

10 55. The moisture indicator system as set forth in claim 54, wherein said duct includes a valve housing, each of said rivets extending into said valve housing and having an end positioned in the interior of said valve housing, wherein said end is flanged back against said valve housing to secure said rivet to said valve housing.

15 56. The moisture indicator system as set forth in claim 54, wherein said duct includes a rib attached to said duct and extending across the interior of said duct, said electrodes being mounted on said rib.

20 57. The moisture indicator system as set forth in claim 3 including a suction duct, a control valve being pivotally connected to said suction duct, wherein said electrodes are mounted to said control valve.

25 58. The moisture indicator system as set forth in claim 57, wherein said control valve includes a shaft pivotally mounted to said suction duct, and said electrodes being mounted to said shaft.